

Claims:

1. A fuel cell system, comprising:
 - (a) a fuel cell having a first reactant inlet, a first reactant outlet, a second reactant inlet, and a second reactant outlet;
 - 5 (b) a first reactant supply subsystem including a first reactant supply means for supplying a first reactant incoming stream to the first reactant inlet of the fuel cell;
 - (c) a second reactant supply subsystem for supplying a second reactant incoming stream to the second reactant inlet of the fuel cell;
 - 10 (d) a monitoring device for monitoring a fuel cell state variable indicative of flooding of the fuel cell; and
 - (e) a controller for controlling the first reactant supply means to provide an additional amount of the first reactant to the fuel cell based on the fuel cell state variable.
- 15 2. A fuel cell system as claimed in claim 1 wherein the controller is further operable to control the second reactant supply means to provide an additional amount of the second reactant to the fuel cell based on the fuel cell state variable.
- 20 3. A fuel cell system as claimed in claim 1, further comprising a second reactant purge means, wherein the controller is operable to control the second reactant purge means to purge at least a portion of the second reactant exhaust stream from the second reactant outlet when the fuel cell state variable indicates the fuel cell is flooded.
- 25 4. A fuel cell system as claimed in claim 3, wherein the controller controls the first reactant supply means to operate at maximum capacity when the fuel cell state variable indicates the fuel cell is flooded.

5. A fuel cell system as claimed in claim 4, wherein the controller is operable to control the first reactant supply means to stop supplying the additional amount of the first reactant and to control the second reactant purge means to stop purging when the fuel cell state variable indicates the fuel cell is no longer flooded.

6. A fuel cell system as defined in claim 5 wherein the fuel cell state variable is a cell voltage and the monitoring device comprises a voltage monitor for monitoring the cell voltage.

7. A fuel cell system as defined in claim 6 wherein the controller is operable to determine the fuel cell is flooded when the cell voltage is less than a first value.

8. A fuel cell system as defined in claim 7 wherein the controller is operable to determine the fuel cell is no longer flooded when the cell voltage is more than a second value.

9. A fuel cell system as claimed in claim 8, wherein the first value is value is same as second value.

10. A method of operating a fuel cell system, the fuel cell having a first reactant inlet, a first reactant outlet, a second reactant inlet, a second reactant outlet, said method comprising:

(a) providing a first reactant incoming stream to the first reactant inlet;

(b) providing a second reactant incoming stream to the second reactant inlet;

(c) monitoring a fuel cell state variable indicative of flooding;

(d) based on the fuel cell state variable, determining whether the fuel cell is flooded;

(e) providing an additional amount of the first reactant to the fuel cell when the fuel cell is flooded.

11. A method of operating a fuel cell system as claimed in claim 10, wherein step (e) further comprises providing an additional amount of the second reactant to the fuel cell when the fuel cell is flooded.

12. A method of operating a fuel cell system as claimed in claim 10, wherein step (e) further comprises purging at least a portion of the second reactant exhaust stream from the second reactant outlet when the fuel cell state variable indicates the fuel cell is flooded.

10 13. A method of operating a fuel cell system as claimed in claim 12, wherein step (e) further comprises increasing the rate at which the first reactant supplied to the fuel cell to the maximum capacity of the fuel cell system when the fuel cell state variable indicates the fuel cell is flooded.

14. A method of operating a fuel cell system as claimed in claim 13, further comprising stopping the additional amount of the first reactant being supplied to the fuel cell and purging the second reactant from the second reactant outlet, when the fuel cell state variable indicates the fuel cell is no longer flooded.

15. A method of operating a fuel cell as claimed in claim 13 wherein the fuel cell state variable is a cell voltage, and step (c) comprises measuring the cell voltage.

16. A method of operating a fuel cell system as claimed in claim 15 wherein step (d) comprises determining the fuel cell is flooded when the cell voltage is less than a first value.

25 17. A fuel cell system as defined in claim 16 wherein step (d) comprises determining the fuel cell is no longer flooded when the cell voltage is more than a second value.

18. A method of operating a fuel cell system as claimed in claim 10, wherein the first value is same as the second value.